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DRAFT
ENVIRONMENTAL IMPACT STATEMENT
FOR THE
GILBERTON COAL-TO-CLEAN FUELS
AND POWER PROJECT

GILBERTON, PENNSYLVANIA

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TITLE

Draft Environmental Impact Statement for the Gilberton Coal-to-Clean Fuels and Power Project

LOCATION

Gilberton, Pennsylvania

CONTACTS

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ABSTRACT

This EIS assesses the potential environmental impacts that would result from a proposed DOE action to provide cost-shared funding for construction and operation of facilities near Gilberton, Pennsylvania, which have been proposed by WMPI PTY, LLC, for producing electricity, steam, and liquid fuels from anthracite coal waste (culm). The project has been selected by DOE under the Clean Coal Power Initiative (CCPI) to demonstrate the integration of coal waste gasification and Fischer-Tropsch (F-T) synthesis of liquid hydrocarbon fuels at commercial scale. The proposed facilities would use a gasifier to convert coal waste to synthesis gas, which would be conveyed to F-T liquefaction facilities for production of liquid fuels and to a combined-cycle power plant. The power plant would use the synthesis gas to drive a gas combustion turbine and exhaust gas from the gas turbine to generate steam from water to drive a steam turbine. Both turbines would generate electricity.

The EIS evaluates potential impacts of the proposed facilities on land use, aesthetics, air quality, geology, water resources, floodplains, wetlands, ecological resources, socioeconomic resources, waste management, human health, and noise. The EIS also evaluates potential impacts on these resource areas for a scenario resulting from the no-action alternative (DOE would not provide cost-shared funding) in which the proposed facilities would not be built or operated.

PUBLIC PARTICIPATION

DOE encourages public participation in the NEPA process. Comments are invited on this draft EIS and should be received no later than 45 days after publication of the Notice of Availability in the *Federal Register*. DOE will consider late comments to the extent practicable. Comments should be addressed to Ms. Janice L. Bell at the address provided above. DOE will conduct two formal public hearings to receive comments on the draft EIS. These meetings will be held at the Shenandoah Valley Junior/Senior High School and the D.H.H. Lengel Middle School. An informal session will be held prior to each meeting for the public to learn more about the proposed project. Meetings dates and times will be published in a separate *Federal Register* notice.

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ACRONYMS AND ABBREVIATIONS

ADT	average daily traffic
amsl	above mean sea level
BMP	best management practices
Btu	British thermal unit
°C	degrees Celsius
CCPI	Clean Coal Power Initiative
CEQ	Council on Environmental Quality
CFR	*Code of Federal Regulations*
cm	centimeter
CO	carbon monoxide
CO_2	carbon dioxide
dB	decibel
dB(A)	decibels as measured on the A-weighted scale
DOE	U.S. Department of Energy
EIS	environmental impact statement
EMF	electromagnetic fields
EPA	U.S. Environmental Protection Agency
°F	degrees Fahrenheit
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FR	*Federal Register*
F-T	Fischer-Tropsch
ft	feet
ft^3	cubic feet
g	acceleration of gravity
gal	gallon
gpm	gallons per minute
H_2	hydrogen gas
H_2O	water
H_2S	hydrogen sulfide
HRSG	heat recovery steam generator
in.	inch
IPCC	Intergovernmental Panel on Climate Change
ISCST	Industrial Source Complex Short-Term (an air dispersion model)
kg	kilogram
L	liter
lb	pound
m^3	cubic meter
µg	microgram
µm	micrometer
µS	microsiemens
MCLG	Maximum Contaminant Level Goal
mg	milligram
mgd	million gallons per day
MPCA	Minnesota Pollution Control Agency
mV	millivolt
MW	megawatt

NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NEPaA	Northeastern Pennsylvania Alliance
NIEHS	National Institute of Environmental Health Sciences
NO_2	nitrogen dioxide
NO_x	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRC	National Research Council
NSC	National Safety Council
O_3	ozone
ORNL	Oak Ridge National Laboratory
OSHA	Occupational Safety and Health Administration
Pb	lead
PDC	Pennsylvania Department of Corrections
PDCNR	Pennsylvania Department of Conservation and Natural Resources
PDEP	Pennsylvania Department of Environmental Protection
PDLI	Pennsylvania Department of Labor and Industry
PDOT	Pennsylvania Department of Transportation
PFBC	Pennsylvania Fish and Boat Commission
PGC	Pennsylvania Game Commission
pH	hydrogen-ion concentration notation
PM	particulate matter
PM-2.5	particulate matter less than 2.5 µm in aerodynamic diameter
PM-10	particulate matter less than 10 µm in aerodynamic diameter
PNDI	Pennsylvania Natural Diversity Inventory
ppm	parts per million
PSD	Prevention of Significant Deterioration
R&D	research and development
RCRA	Resource Conservation and Recovery Act
s	second
SAIC	Science Applications International Corporation
SCREEN3	a screening air dispersion model
SEDCO	Schuylkill Economic Development Corporation
SHPO	State Historic Preservation Officer
SO_2	sulfur dioxide
SPCCP	spill prevention, control, and countermeasures plan
SPLP	Synthetic Precipitation Leaching Procedure
SRBC	Susquehanna River Basin Commission
U.S.	United States
USC	*United States Code*
USGS	U.S. Geological Survey
VOC	volatile organic compound
yd^3	cubic yard

GLOSSARY

Aerodynamic diameter—a term used to describe particles with common aerodynamic properties, which avoids the complications associated with varying particle sizes, shapes, and densities. For example, PM-10 is defined in 40 CFR 50 as consisting of particles 10 micrometers or less in aerodynamic diameter, meaning particles that behave aerodynamically like spherical particles of unit density (1 gram per cubic centimeter) having diameters of 10 micrometers or less.

Air dispersion model—computer program that incorporates a series of mathematical equations used to predict downwind concentrations in the ambient air resulting from emissions of a pollutant. Inputs to a dispersion model include the emission rate; characteristics of the emission release such as stack height, exhaust temperature, and flow rate; and atmospheric dispersion parameters such as wind speed and direction, air temperature, atmospheric stability, and height of the mixed layer.

Anthracite—the hardest type of coal, characteristically black in color, lustrous, with a conchoidal fracture (smoothly curved, irregular breakage surface). Anthracite coal consists of 92-98% carbon and less than 8% volatile constituents by weight.

Anticline—a geologic fold that is arch-like in form, with rock layers dipping outward from both sides of the axis, and older rocks in the core. The opposite of syncline.

Aquifer—a body of rock or sediment that is capable of transmitting groundwater and yielding usable quantities of water to wells or springs.

Artesian—groundwater conditions in which water in wells rises above its level in the aquifer, including conditions in which groundwater rises to the ground surface or above.

Ash—the mineral content of a product remaining after complete combustion.

Baghouse—an air pollution control device that filters particulate emissions, consisting of a bank of bags that function like the bag of a vacuum cleaner; the bags intercept particles that are mostly larger than 10 micrometers in aerodynamic diameter.

Beneficiation—the process of washing or otherwise cleaning coal to increase the energy content by reducing the ash content.

Biocide—a substance (e.g., chlorine) that is toxic or lethal to many organisms and is used to treat water.

Blowdown—the portion of steam or water removed from a boiler at regular intervals to prevent excessive accumulation of dissolved and suspended materials.

Bottom ash—combustion residue composed of large particles that settle to the bottom of a combustor from where they can be physically removed.

Building downwash—the downward movement of an elevated plume toward the area of low pressure created on the lee side of a structure in the wake around which the air flows.

Capacity factor—the percentage of energy output during a period of time compared to the energy that would have been produced if the equipment operated at its maximum power throughout the period.

Census tract—a small, relatively permanent statistical subdivision of a county.

Coal gasification—a process that converts coal into a gaseous product, which involves crushing coal into a powder and heating the powder in the presence of steam and oxygen. After impurities (e.g., sulfur) are removed, the gas can be used as a fuel or further processed and concentrated into a chemical or liquid fuel.

Combustor—equipment in which coal or other fuel is burned at high temperatures.

Cooling water—water that is heated as a result of being used to cool steam and condense it to water.

Culm—coal waste that consists of rock and coal with varying amounts of carbon material remaining after removal of higher-quality saleable coal.

Culm bank—a pile or other deposit of culm on the land surface.

Evapotranspiration—the amount of water removed from a land area by the combination of direct evaporation and plant transpiration.

Fault—a fracture or fracture zone in rock along which the sides have been displaced vertically or horizontally relative to one another.

Fischer-Tropsch (F-T) synthesis—a process that uses a metal-containing catalyst to convert a mixture of carbon monoxide and hydrogen (known as synthesis gas) into a mixture of carbon dioxide, water, and aliphatic compounds (hydrocarbons lacking an arrangement of atoms in their molecular structure), which are used to produce liquid fuels.

Floodplain—the strip of relatively level land adjacent to a river channel that becomes covered with water if the river overflows its banks.

Flue gas—residual gases after combustion that are vented to the atmosphere through a flue or chimney.

Flux—a material (e.g., limestone) that is added to a substance to lower the melting temperature of the substance and promote fluidity.

Fly ash—combustion residue composed of fine particles (e.g., soot) that are entrained with the draft leaving the combustor.

Formation—the primary unit associated with formal geological mapping of an area. Formations possess distinctive geological features and can be combined into “groups” or subdivided into “members.”

Gaussian—concentrations of pollutants downwind of a source are assumed to form a normal distribution (i.e., bell-shaped curve) from the centerline of the plume in the vertical and lateral directions.

Groundwater—water below the ground surface in a zone of saturation.

Hazardous waste—a category of waste regulated under the Resource Conservation and Recovery Act (RCRA). To be considered hazardous, a waste must be a solid waste under RCRA and must exhibit at least one of four characteristics described in 40 CFR 261.20 through 40 CFR 261.24 (i.e., ignitability, corrosivity, reactivity, or toxicity) or be specifically listed by the Environmental Protection Agency in 40 CFR 261.31 through 40 CFR 261.33.

Integrated gasification combined-cycle—a process that uses synthesis gas derived from coal to drive a gas combustion turbine and exhaust gas from the gas turbine to generate steam from water to drive a steam turbine.

Laydown area—material and equipment storage area during the construction phase of a project.

Leachate—solution or product obtained by leaching, in which a substance is dissolved by the action of a percolating liquid.

Liquefaction—the process of transforming a gas into a liquid.

Magnitude (of an earthquake) —a quantity that is characteristic of the total energy released by an earthquake. Magnitude is determined by taking the common logarithm of the largest ground motion recorded on a seismograph during the arrival of a seismic wave type and applying a standard correction factor for distance to the epicenter. A one-unit increase in magnitude (e.g., from magnitude 6 to magnitude 7) represents a 30-fold increase in the amount of energy released.

Maximum Contaminant Level Goal (MCLG) —the maximum concentration of a substance in drinking water at which there is no known or anticipated adverse effect on human health, and which allows an adequate margin of safety, as determined by the U.S. Environmental Protection Agency.

Petroleum coke—a high-sulfur, high-energy product having the appearance of coal, which is produced by oil refineries by heating and removing volatile organic compounds (VOCs) from the residue remaining after the refining process.

pH—a measure of the relative acidity or alkalinity of a solution, expressed on a scale from 0 to 14, with the neutral point at 7. Acid solutions have pH values lower than 7, and basic (i.e., alkaline) solutions have pH values higher than 7.

Plume (atmospheric)—a visible or measurable, elongated pattern of emissions spreading downwind from a source through the atmosphere.

Safe yield—the maximum quantity of water that can be withdrawn continuously from a surface water or groundwater source during a 50-year (or greater) drought without ultimate depletion of the source (considering intrusion of undesirable-quality water, interference with other existing water sources, downstream flow requirements, and other factors).

Secondary drinking water standards—non-enforceable federal guidelines regarding cosmetic effects (e.g., tooth or skin discoloration) or aesthetic effects (e.g., taste, odor, or color) of drinking water.

Selective catalytic reduction—a system to reduce NO_x emissions by injecting a reagent such as ammonia into exhaust gas to convert NO_x emissions to nitrogen gas and water via a chemical reduction reaction.

Slag—molten inorganic material collected at the bottom of a combustor and discharged into a water-filled compartment where it is quenched and removed as glassy particles resembling sand.

Sludge—a semi-solid residue containing a mixture of solid waste material and water from air or water treatment processes.

Slurry—a watery mixture or suspension of fine solids, not thick enough to consolidate as a sludge.

Specific yield—the volume of water released from storage in a unit area of an unconfined aquifer per unit decline in the water table. Values are dimensionless (corresponding, for example, to cubic feet of water per square foot of aquifer per foot of water table decline) and typically are between 0.01 and 0.3. In physical terms, the specific yield can be understood as the fraction of the aquifer volume that consists of drainable void space.

Spring—a location on the land surface or the bed of a surface water body where groundwater emerges from rock or soil without artificial assistance.

Syncline—a geologic fold in which the rock layers dip inward from both sides toward the axis, with younger rocks in the core. The opposite of anticline.

Synthesis gas—a mixture of gases produced as feedstock, especially as a fuel produced by controlled combustion of coal in the presence of water vapor.

Tailings pond—an outside water-filled enclosure that receives discharges of wastewater containing solid residues from processing of minerals. The solid residues settle due to gravity and separate from the water.

Wetlands—areas that are inundated by surface water or groundwater with a frequency sufficient to support, under normal circumstances, a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, sloughs, potholes, wet meadows, river overflow areas, mudflats, and natural ponds.

SUMMARY

This environmental impact statement (EIS) has been prepared by the U.S. Department of Energy (DOE), in compliance with the National Environmental Policy Act of 1969 (NEPA) as amended (42 USC 4321 et seq.), Council on Environmental Quality regulations for implementing NEPA (40 CFR Parts 1500-1508), and DOE NEPA regulations (10 CFR Part 1021). The EIS evaluates the potential environmental impacts associated with the construction and operation of facilities near Gilberton, Pennsylvania, which have been proposed by WMPI PTY, LLC, for producing electricity, steam, and liquid fuels from anthracite coal waste (culm). The project has been selected by DOE under the Clean Coal Power Initiative (CCPI) to demonstrate the integration of coal waste gasification and Fischer-Tropsch (F-T) synthesis of liquid hydrocarbon fuels at commercial scale. The CCPI Program accelerates commercial deployment of advanced coal-based technologies for generating clean, reliable, and affordable electricity in the United States by moving promising technologies from research and development (R&D) to the commercial marketplace through demonstration.

The EIS will be used by DOE in making a decision on whether or not to provide approximately $100 million (about 16% of the total cost of approximately $612 million) in cost-shared funding to design, construct, and demonstrate the technologies proposed by WMPI PTY, LLC, at the proposed facilities. The proposed action is for DOE to provide the cost-shared funding. DOE determined that providing cost-shared funding for the proposed project would constitute a major federal action that may significantly affect the quality of the human environment. Therefore, DOE has prepared this EIS to assess the potential impacts on the human and natural environment of the proposed action and reasonable alternatives. DOE may also provide a loan guarantee, pursuant to the Energy Policy Act of 2005, to guarantee a portion of the private sector financing for the project. If a loan guarantee is provided, DOE's contribution of approximately $100 million to the project would likely be reduced.

The proposed facilities would use a gasifier to convert coal waste to synthesis gas, which would be conveyed to F-T liquefaction facilities for production of liquid fuels and to a combined-cycle power plant. The power plant would use the synthesis gas to drive a gas combustion turbine and exhaust gas from the gas turbine to generate steam from water to drive a steam turbine. Both turbines would generate electricity. For coal gasification, the project would use Shell technology, which has operated commercially using coal feedstock in the Netherlands since the 1990s. For liquefaction, the SASOL F-T technology would be used, which has operated commercially in South Africa since the 1980s.

The purpose of the proposed project is to generate technical, environmental, and financial data from the design, construction, and operation of the integrated technologies at a sufficiently large scale to allow industries and utilities to assess the project's potential for commercial application. While the individual technologies have been independently operated, this project would demonstrate the integration of the technologies, which may ultimately help to reduce U.S. dependence on imported oil.

The site for the proposed project is located adjacent to the existing Gilberton Power Plant in Schuylkill County in eastern Pennsylvania. The area is primarily rural with a mixture of industrial, commercial, and residential land use in the vicinity. The site is about 1 mile north of Interstate 81. The city of Pottsville is located about 8 miles to the south of the site. The main plant for the proposed project would occupy about 75 acres of nearly level WMPI-owned land on top of Broad Mountain. The land is currently an undisturbed forested area.

Construction of the proposed facilities would begin in early 2006 and continue until mid 2008. An average of 516 construction workers would be at the site during the construction period; approximately 1,000 workers would be required during the peak construction period. Demonstration (including performance testing and monitoring) would be conducted over a 3-year period from mid 2008 until mid 2011. If the demonstration is successful, commercial operation would follow immediately. About 250 workers would be required during the demonstration, and 150 workers would be needed for long-term operations. The facilities would be designed for a lifetime of 26 years.

The primary feedstock for the proposed facilities would be low-cost anthracite culm, which is a locally abundant, previously discarded resource (about 100 million tons) that could accommodate fuel requirements throughout the lifetime of the facilities. The culm would be trucked to the site from the surrounding local area. The proposed facilities would also be capable of using a blend of feedstock containing up to 25% petroleum coke, although no petroleum coke would be used during the demonstration period and its use during commercial operation following the demonstration period is uncertain. Micronized limestone, which would be used as a flux added to the feedstock to lower the ash melting temperature of the culm and promote fluidity, would be trucked from mines within 100 miles of the project site.

The facilities would produce about 5,000 barrels of liquid fuels per day and 41 MW of electricity for export to the regional power grid. To reduce costs, the project would take advantage of existing local infrastructure, including rail, water, and transmission lines. The net efficiency would be about 45%, compared to an efficiency of about 33% for a traditional coal-fired power plant and about 40% for a state-of-the-art integrated gasification combined-cycle power plant.

Proposed emissions from the facilities would be small, especially for sulfur dioxide (SO_2), because most of the sulfur would be removed from the synthesis gas prior to conveying the gas to the F-T liquefaction facilities and the combined-cycle power plant. The use of anthracite culm would reduce waste disposal from operating mines and allow reclamation of land currently stockpiled with culm.

The EIS considers the proposed action (funding the demonstration) and the no-action alternative (not funding the demonstration), including a scenario reasonably expected to result as a consequence of the no-action alternative. Other alternatives to the proposed action have been examined and found not to be reasonable alternatives under NEPA. No other sites to host the proposed project were seriously considered by WMPI PTY, LLC and its project partners. The geographical area considered for the proposed site was limited by the economic and environmental advantages resulting from using nearby piles of anthracite culm as feedstock for the proposed facilities. Other technologies have been

dismissed as not reasonable. Other CCPI projects were selected to demonstrate other coal-based technologies. The use of other technologies and approaches that are not applicable to coal (e.g., natural gas, wind power, solar energy, and conservation) would not contribute to the CCPI Program goal of accelerating commercial deployment of advanced coal-based technologies. Other alternatives, such as delaying or reducing the size of the proposed project, have been dismissed as not reasonable. Delaying the project would not result in any change of environmental impacts once the project were implemented but would adversely delay reductions in waste disposal from operating mines, delay reclamation of land currently stockpiled with culm, and adversely affect the CCPI Program goal. The design size for the proposed project was selected because it is sufficiently large to show potential customers that the integrated technologies, once demonstrated at this scale, could be applied commercially without further scale-up.

Potential impacts that could result from construction and operation of the proposed facilities, as well as potential impacts resulting from the scenario under the no-action alternative, were evaluated in the areas of land use, aesthetics, air quality, geology, water resources, floodplains, wetlands, ecological resources, socioeconomic resources, waste management, human health, and noise. The following sections provide key findings for areas of potential concern related to construction and operation of the proposed facilities.

Potential Impacts

Land Use and Aesthetics. The proposed main plant would be confined to the area between the existing Gilberton Power Plant and the Mahanoy State Correctional Institution, and thus would not affect offsite land use. The ancillary facilities would not affect offsite land use due to their small size (i.e., a few acres) and location adjacent to ancillary facilities for the Gilberton Power Plant. Over the 26-year operating life of the proposed facilities, approximately 1,000 acres of land would be reclaimed after culm removal to provide feedstock for the facilities.

Five 200-ft stacks and one 300-ft stack would be constructed as part of the proposed facilities. The five 200-ft stacks would be considerably shorter than the existing 326-ft stack at the adjacent Gilberton Power Plant, and the 300-ft stack would be slightly shorter. The new gasifier and turbine buildings would be similar in size to the existing power plant buildings. Because the visual landscape of the area is already conspicuously marked with industrial structures, the proposed facilities would not alter the industrial appearance of the site and, accordingly, would not degrade the aesthetic character of the area.

Air Quality. Emissions of air pollutants would be discharged primarily from the five new 200-ft stacks located in the main plant area of the proposed facilities. A computer-based air dispersion model was used to estimate maximum increases in ground-level concentrations of SO_2, nitrogen dioxide (NO_2), particulate matter less than or equal to 10 μm in aerodynamic diameter (PM-10), and carbon monoxide (CO) that would occur at any location as a result of emissions from the stacks. In this analysis, the significance of the maximum predicted concentrations was evaluated using "significant impact levels" (a form of ambient air quality standards, as described below). According

to U.S. Environmental Protection Agency (EPA) guidelines, a preliminary modeling analysis using significant impact levels should include only the emissions associated with the proposed facilities to determine if the facilities would have a significant impact on ambient air quality. If the maximum predicted concentrations are less than the significant impact levels, additional modeling, including other sources and background concentrations, is not required.

Initial results indicated that maximum concentrations were predicted to be less than their corresponding significant impact levels, with the exception of the annual NO_2 concentration, which had a value of 1.1 $\mu g/m^3$ versus a significant impact level of 1 $\mu g/m^3$. However, oxides of nitrogen (NO_x) emissions from the proposed facilities would be composed of both NO_2 emissions and nitric oxide (NO) emissions. Because not all NO emissions would convert to NO_2 in the atmosphere, the analysis was refined by relaxing the initial conservative assumption that all NO_x emissions would be in the form of NO_2. The revised maximum annual NO_2 concentration was predicted to be 0.8 $\mu g/m^3$, which was less than the significant impact level of 1 $\mu g/m^3$ for NO_2. Therefore, additional modeling, including other sources and background concentrations, was not required for any of the pollutants. Due to the conservative assumptions used in the analysis, actual degradation of air quality should be even less than the small amounts predicted.

Maximum concentrations for all pollutants were predicted to occur at the same location, on top of Locust Mountain, slightly over 3 miles north of the main plant area. Concentrations would be negligible at the nearest Prevention of Significant Deterioration (PSD) Class I area (Brigantine Wilderness Area), about 130 miles to the southeast in New Jersey. Dispersion of pollutants at that distance would reduce atmospheric concentrations to a small fraction of the maximum modeled concentrations, which were predicted to be less than PSD Class I increments (standards) at the location of their maximum impact (i.e., on top of Locust Mountain).

Ozone (O_3) is not emitted directly from a combustion source, but is formed from photochemical reactions involving emitted volatile organic compounds (VOCs) and NO_x. Stack VOC emissions from the proposed facilities would be less than 0.4% of Schuylkill County's VOC emissions inventory. Stack NO_x emissions would be less than 1% of the county's NO_x emissions inventory. Because the nearest O_3 monitoring station is located in Reading, about 35 miles south-southeast of Gilberton, existing ambient O_3 concentrations in the area are uncertain. The small percentage increases in VOC and NO_x emissions would not be likely to degrade local or regional air quality sufficiently to cause violations in the O_3 standards, but the magnitude of the degradation cannot be quantified.

Regarding hazardous air pollutants, the synthesis gas would be cleaned extensively by wet scrubbing followed by acid gas removal using a Rectisol unit, prior to sending the gas to the F-T synthesis facilities and the combined-cycle power plant. As a result, a high percentage of hazardous air pollutants and trace elements in the synthesis gas would be removed, but no quantitative estimates of the proposed facilities' emissions of these pollutants are currently available. However, the air permit for the proposed facilities establishes maximum allowable limits for total facility emissions of less than 10 tons for any single hazardous air pollutant and less than 25 tons altogether for any combination of hazardous air pollutants during any consecutive 12-month rolling

period. The permitted limits function as a cap to ensure that the proposed facilities would be a minor new source of hazardous air pollutants under applicable regulations.

During the scoping process, local residents expressed concern about the potential for odorous emissions of hydrogen sulfide (H_2S). For the proposed facilities, nearly complete H_2S removal from the shifted synthesis gas, occurring in the acid gas removal plant using a Rectisol unit, would be required by the downstream F-T synthesis process. Remaining concentrations would be as low as 1 to 5 ppm. The captured H_2S would be converted to marketable elemental sulfur in a Claus sulfur recovery unit, a process which should remove approximately 99.99% of the sulfur from the recovered acid gas stream. Thus, odorous emissions of H_2S should not be perceptible.

During the scoping process, local residents also expressed concern about the possibility of emissions from the proposed facilities creating safety issues, such as emissions from the new bank of 12 mechanical-draft cooling towers generating fog that would affect Interstate 81. During occasional meteorological conditions when the atmosphere is nearly saturated, winds are light, and mixing is very low (i.e., during some early morning hours), condensation of water vapor from the cooling towers is possible, which would appear in the form of a cooling tower plume and/or fog. The fog would probably not affect Interstate 81, due to the distance from the proposed site. No fog resulting from existing Gilberton Power Plant operations has been observed on Interstate 81. However, upon initial operation of the proposed facilities, conditions at the interstate would be monitored and, if warranted, flashing lights would be installed to warn motorists of fog.

The proposed facilities would increase global CO_2 emissions by about 832,000 tons per year, which is about 0.003% of global CO_2 emissions resulting from fossil fuel combustion. Thus, increases from the proposed facilities would be large in terms of number of tons per year but small in comparison to global totals.

Geology. Because the proposed main plant would be built over rock units that do not contain coal, the plant would not be affected by subsidence from mining activities. Subsidence could, however, affect product transfer lines and related facilities in the valley of Mahanoy Creek. Abrupt subsidence could rupture product transfer lines and release liquid fuels into the environment. Environmental consequences of such an event would be similar to those from collision and rupture of a gasoline truck, potentially including fire, explosion, and release of a toxic material into surface waters and soils. Gradual subsidence also could damage product lines and cause leakage, with similar but smaller impacts. The possibility of abrupt subsidence has decreased over time following the closure of underground mines, and will continue to decrease in the future. The potential risks of product line leakage due to gradual subsidence would be reduced by inspecting product lines regularly and repairing any problems.

Water Resources. During construction, water quality could be affected by stormwater runoff from construction sites. Standard engineering practices such as silt fencing, straw bales, revegetation of graded areas, and stormwater detention basins would be implemented to control runoff, erosion, and sedimentation. If runoff from the site drained to old strip mining pits on the north or south slopes of Broad Mountain, any sediments would settle out in the pits before the remaining water would seep

to the underlying mine pools. If runoff were directed toward tributaries of Mill Creek, it would be routed through detention basins in which sediments would settle out before the water would be released to a stream. Impacts attributable to construction-related runoff would be minimal.

Construction and operation of the proposed facilities would not change groundwater use on Broad Mountain, but the facilities would increase the area of impervious surface. Water that previously would infiltrate the soil to enter the groundwater under Broad Mountain would instead become stormwater runoff and would be discharged to streams or strip mining pits, thus reducing groundwater recharge to the aquifers on Broad Mountain. Estimated recharge within a 1,000-ft radius of the Morea well should remain sufficient to meet the needs of the Morea water system. The wells serving the Gilberton Power Plant are closer to the proposed main plant site than the Morea well is to the main plant site, and thus would be more likely to experience any impacts from reduced recharge. If the water supply were affected, the facilities' owners would address the situation by establishing a connection with one of the public water suppliers. Because other wells in the area are farther from the proposed facilities than the Morea well is from the proposed facilities, they should not be affected by reduced recharge.

Operation of the proposed facilities would reduce the water volume in the Gilberton mine pool and the volume of water needed to be pumped from the mine pool and discharged to Mahanoy Creek in order to prevent flooding. These changes would result in reduced stream flow in the creek. However, the creek would not go dry from receiving less mine pool water because the creek's minimum flows would be maintained by continuous discharges from mine openings in upstream portions of the watershed. Because the stream is not a source of water supply due to poor water quality, reduced flow would not affect water availability.

Discharge of treated effluent to the mine pool by seepage from the tailings pond would be expected to improve mine pool water quality by reducing concentrations of acidity and dissolved metals. Consequently, water pumped from the mine pool to Mahanoy Creek would also improve in quality. Reduced loadings of acidity, manganese, aluminum, and iron would increase the potential for Mahanoy Creek to provide suitable habitat for aquatic life. Concentrations of sulfate in the stream could increase, but this increase would not affect attainment of water quality criteria because no water quality criteria exist for sulfate in waters designated for use as aquatic habitat.

Floodplains and Wetlands. The main plant would be located at an elevation well above the Federal Emergency Management Agency's delineated 100-year floodplain. A new culm beneficiation plant or expansion of the existing facility in the adjacent valley to the north of the main plant area would also lie above the elevation of the 100-year floodplain. Ancillary facilities that would cross the 100-year floodplain of Mahanoy Creek would be placed atop an existing trestle at an elevation above the level of the 100-year flood. No new construction within the floodplain would be required. Construction and operation of the proposed facilities would have no adverse effects on wetlands because none are present on the project site. Runoff and spills from the site would not be expected to reach wetlands due to use of standard construction engineering practices and spill control procedures.

Ecological Resources. Loss of approximately 75 acres of deciduous forest to construct the main plant and 1.5 acres for ancillary structures would affect wildlife species. Other factors associated with construction of the proposed facilities would include increased human activity in the main plant area, increased traffic on local roads, and noise. The presence of construction crews and increased traffic would cause some wildlife species to avoid areas next to the construction site during the 30-month construction period. Burrowing and less mobile species such as amphibians, some reptiles, and some small mammals could be adversely affected during site preparation activities. Construction would temporarily modify the quality of the surrounding habitat in the project area by the creation of noise. No long-term impacts on the hearing ability of wildlife species would be expected from construction-generated noise. Some unavoidable impacts on wildlife would occur as a result of increased vehicular traffic. Construction traffic along the new access road would increase the potential for roadkills for animals such as turkeys, squirrels, and chipmunks.

The loss of deciduous forest during construction would displace some small mammals and songbirds from the construction areas, but would not be expected to eliminate any wildlife species from Broad Mountain because similar habitat is relatively common along and on both sides of the ridge. Clearing for support facilities would create additional forest edge and introduce habitat diversity as these areas partially revegetate. This would tend to benefit edge-related wildlife species, while displacing forest-related species from the new habitat. Over the 26-year operating life of the proposed facilities, the terrestrial habitat created on approximately 1,000 acres of reclaimed land after culm removal would offset the 76.5 acres of deciduous forest that would be cleared for the facilities.

Impacts to aquatic habitats and fish from construction and operation of the proposed facilities would be minor to negligible. No surface waters are on or in the immediate vicinity of the proposed project site. Because the proposed facilities would not be located within an area that provides habitat for any protected species except for occasional transient individuals, it is unlikely that any such species would be affected by project construction or operations.

Social and Economic Resources. Construction and operation of the proposed facilities would not result in major impacts to population, housing, local government revenues, or public services in Schuylkill County. Overall, construction of the proposed facilities would have short-term positive effects on employment and income in the region. Project operations would also have positive effects on employment and income and, provided that the demonstration is successful, these effects would last longer than the effects of construction. The project's positive effects on employment and income would contribute to the regional economy.

Schuylkill County and eight of the nine census tracts (small, relatively permanent statistical subdivisions of a county) within 3 miles of the proposed facilities have lower minority percentages than Pennsylvania and the United States. For the remaining census tract, however, significant minority populations reside at the Mahanoy and Frackville State Correctional Institutions. The Mahanoy State Correctional Institution is 2,600 ft east of the proposed main plant site, and its minority inmate population represents an "environmental justice" population to which the adverse impacts of constructing and operating the proposed facilities could be distributed disproportionately.

However, disproportionately high and adverse air quality and health impacts to this population would not be expected because (1) air quality impacts would not be appreciable with the exception of temporary fugitive dust during construction; and (2) the Mahanoy State Correctional Institution is a sealed facility in which inmates and employees would not be exposed to outside air except during periods of outdoor activity.

Schuylkill County's population percentage below the poverty level is lower than that of Pennsylvania and the United States. However, two nearby census tracts have poverty rates that exceed those of both Pennsylvania and the United States. The relatively large populations below the poverty level in these tracts represent "environmental justice" populations to which the adverse impacts of constructing and operating the proposed facilities could be distributed disproportionately. However, disproportionately high and adverse air quality, water quality, and health impacts to these populations would not be expected. The proposed project could have positive economic effects for these populations by creating employment and income in the region.

With regard to transportation, all of the 1,000 workers during the 6-month peak construction period would access the project site from State Route 1008 (Morea Road), and most of these workers would access State Route 1008 from its intersection with State Route 61 in the town of Frackville. This assessment assumed that 1,000 additional vehicle trips (500 to the site and 500 from the site) would be generated each day during the peak construction period, which would represent increases of 10% and 22% over existing traffic on State Route 61 and State Route 1008, respectively. Increases of this size on these roads would likely cause traffic congestion and have an appreciable impact on traffic flow and safety during morning and afternoon commutes. In addition to these construction workers' vehicles, the number of construction delivery trucks accessing the project site from State Route 61 and State Route 1008 would increase. WMPI personnel have committed to contacting the Pennsylvania Department of Transportation to discuss potential mitigation options, including signaling, road widening, and scheduling work hours and/or deliveries to avoid periods of heavy traffic.

During the demonstration and long-term project operations, all of the 250 and 150 workers, respectively, would access the facilities from State Route 1008 (primarily via State Route 61 in Frackville). This assessment assumed that 500 additional vehicle trips (250 to the site and 250 from the site) would be generated each day by workers commuting during the demonstration, while 300 additional vehicle trips (150 to the site and 150 from the site) would be generated each day by workers commuting during long-term operations. Approximately 104 truck trips per day (52 to the site and 52 from the site) would deliver culm to the site, 40 truck trips per day (20 to the site and 20 from the site) would bring limestone, and 22 truck trips per day (11 to the site and 11 from the site) would transport waste material to an offsite landfill. In addition, if liquid fuels produced by the proposed facilities should be shipped by truck rather than rail, about 80 additional vehicle trips would occur daily (40 to the site and 40 from the site). The impacts of operations-related traffic would be less severe than those of construction-related traffic but would be more long lasting. WMPI personnel

have committed to contacting the Pennsylvania Department of Transportation to discuss the same potential mitigation options as those available for construction-related traffic.

Once per week, a new supply of empty tank cars would be delivered, and a train of tank cars filled with liquid fuels produced by the proposed facilities would be transported from the site. Rail shipments of this magnitude would not have adverse impacts on the local rail system.

DOE has consulted with the Pennsylvania State Historic Preservation Office (SHPO) regarding the potential for impacts associated with the proposed facilities on any historic resources that may be listed in or eligible for the National Register of Historic Places. Impacts from construction and operation of the facilities would not be likely because the SHPO has identified no such historic or archaeological properties in the project area.

Waste Management. Because project construction waste quantities would be small in comparison with commercial landfill capacities and waste quantities currently handled at these facilities, landfills in the region should have ample capacity to receive project construction wastes for disposal.

Solid wastes and byproducts generated by the operation of the proposed facilities would include gasifier slag, fine solids, elemental sulfur, and sludges from water and wastewater treatment. Commercial uses would be sought for the gasifier slag, including lightweight construction aggregate, asphalt roofing shingle granules, blasting grit, and pipe-bedding material. However, markets for this material have not yet been established. Any slag that is not used commercially would be used as fill material for surface mine reclamation at and near sites where culm would be obtained. Because the Pennsylvania residual waste management regulations are intended to prevent or reduce the potential for adverse impacts from leaching of wastes, compliance with these regulations would minimize the potential for adverse impacts to water quality from land application of the slag.

Most of the fine solids generated by the proposed facilities would be used as fill material in a permitted ash disposal area on WMPI land as part of mine reclamation, subject to the same residual waste regulations that would govern the slag. The potential for impacts to water quality from using this material in mine reclamation would be larger than from similar use of slag, but compliance with the residual waste regulations would minimize the potential for adverse impacts to water quality. Provided that the residual waste regulations are met, sludges from treatment of raw water and wastewater would also be placed on WMPI land that is permitted for disposal of coal byproducts. The placement of the proposed facilities' solid wastes and byproducts on lands that were previously mined or covered with culm banks would contribute to reclamation of surface-mined lands. Reclamation activities and needs in the vicinity could easily absorb the volume of material that would be generated by the proposed facilities.

If fine solids or sludges from the facilities failed to meet criteria for land application, they would require disposal in an offsite commercial landfill. The additional waste would increase average daily waste volumes at either of the two nearest landfills by more than 10%. However, commercial landfill capacity in the region appears to be sufficient to handle the additional waste volume. Management of the fine solids and sludges would require special clearance from the Pennsylvania Department of

Environmental Protection. Special handling might also be required before shipment or within the landfill to control the release of water, which could affect the quantity and characteristics of landfill leachate.

Elemental sulfur would be produced and sold commercially. Because consumption in the United States exceeds domestic production, a market should be available for the elemental sulfur that the proposed facilities would generate.

None of the proposed facilities' solid wastes and byproducts would be expected to be hazardous as defined under the Resource Conservation and Recovery Act (RCRA). The Toxicity Characteristic Leaching Procedure test would be performed to verify this expectation, and any wastes found to be subject to RCRA hazardous waste regulations would be handled in accordance with applicable procedures.

Several wastewater collection and treatment units would be used to manage liquid waste streams. Stormwater collected from process areas and stormwater from parking lots and other portions of the site not used for processing or materials storage would be collected in two separate lined retention basins. Wastewater from the gasification and liquefaction processes would be combined with runoff from process areas in an equalization basin, then routed to a series of oil-water separation units where droplets of oil and grease would be recovered and oily sludge would be collected for disposal or recycling to the gasification process. Effluent from this stage of treatment would be mixed with non-oily wastewater streams and routed to a biological treatment unit that would combine aeration with clarification in order to treat wastewater with high levels of chemical and biological oxygen demand. This unit would be designed to consume the organic compounds and nutrients in the wastewater, yielding treated effluent for discharge and a biological sludge for disposal. Treated effluent would be mixed with non-process-area stormwater in an equalization basin for final settling and testing prior to discharge to a tailings pond in Mahanoy Creek valley.

Potential odor impacts from liquid waste streams would be controlled by treating all process wastewater within enclosed facilities prior to discharge to the final equalization basin. Treatment system upsets (e.g., if fluctuations in wastewater characteristics were to cause a die-off of microorganisms in the biological treatment unit) could result in release of incompletely treated water, causing odor problems and water quality degradation off the site. The potential for upsets could be minimized by designing the system with ample reserve capacity, selecting treatment units that are demonstrated to tolerate a wide range of wastewater characteristics, and controlling inflows to the treatment system to maintain consistent wastewater characteristics. Potential for explosion in oil-water separation units could be minimized by using a nitrogen gas blanket over these units.

Human Health and Safety. A potential health impact to the public would be associated with operational air emissions from the proposed facilities, including criteria pollutants and hazardous air pollutants. However, all maximum ambient concentrations of criteria pollutants from the proposed facilities were estimated to be less than their corresponding significant impact levels, and Air Quality Program Permit No. 54-399-034, issued by the Pennsylvania Department of Environmental

Protection for the proposed facilities, establishes maximum allowable limits to ensure that the proposed facilities would be a minor new source of hazardous air pollutants (e.g., mercury).

The proposed facilities would be subject to Occupational Safety and Health Administration standards. During construction, permits would be required and safety inspections would be employed to minimize the frequency of accidents and maximize worker safety. Construction equipment would be required to meet all applicable safety design and inspection requirements, and personal protective equipment would be used, as needed to meet regulatory standards. Operations would be managed from a control room. All instruments and controls would be designed to ensure safe start-up, operation, and shut down. The control system would also monitor operating parameters. The overall design, layout, and operation of the facilities would minimize human hazards. With regard to electromagnetic fields, no perceptible changes would occur because no new transmission line would be built.

While catastrophic accidents would be possible, including accidents involving fire and/or explosion, the probability of such an incident would be remote. The probability of fire or explosion caused by a catastrophic vessel/tank failure would be approximately one occurrence per 100,000 years. The likelihood of fire or explosion resulting from the release of flammable F-T fuels due to catastrophic pipe failure would be about one occurrence per 10,000 years. For potential accidents associated with transport of the produced liquid fuels from the proposed facilities, the U.S. incidence rate for a serious railcar accident involving hazardous materials resulting in a release or injury is approximately 7 accidents per million train-miles. For the proposed project, because a train of filled tank cars would be moved off the site only once per week and because fuels produced by the facilities would be transported to local distribution centers and/or refineries within a 150-mile radius, a rail accident involving the tank cars would be very unlikely.

Noise. During construction of the proposed facilities, the principal sources of noise would be from construction equipment and material handling. The amount and type of construction equipment would vary depending on the specific construction activity occurring at the time (e.g., site excavation, structural steel/mechanical/electrical equipment erection and installation, piping, fabrication, etc.). Construction activity would primarily occur within 6 acres of the 75-acre main plant site.

During operation of the proposed facilities, the principal sound sources would include equipment like the combustion turbine/generator, steam turbine/generator, heat recovery systems, turbine air inlets, exhaust stacks, cooling towers, pumps (e.g., feed, circulating, etc.), and compressors. These sound sources would be enclosed and acoustically insulated. Noise sources within the buildings would be fitted with sound-attenuating enclosures or other noise dampening measures.

The proposed project site’s highest sound level was measured to be 55 dB(A) under existing conditions. The highest sound level during simultaneous operation of the Gilberton Power Plant and the proposed facilities was estimated by assuming that the sound level generated by the two facilities would be equal. A doubling of sound energy corresponding with operation of both facilities yielded an increase of 3 dB, indicating that the proposed site’s highest sound level measurement would be

58 dB(A). A change in sound level of plus or minus 3 dB is the threshold of perception to the human ear.

The center of the proposed main plant would be about 2,600 ft west of the Mahanoy State Correctional Institution. The increase in noise levels (i.e., 3 dB) would probably be imperceptible because of (1) the distance between the prison and the proposed project site, (2) planned noise attenuation measures, (3) natural and man-made terrain features and structures, and (4) the limited period during which the inmates are allowed outside the sealed prison. No perceptible change in noise associated with the proposed facilities would be expected at the nearest residence, located 3,600 ft southeast of the proposed main plant, or other offsite locations.

No-Action Alternative

Under the no-action alternative, DOE would not provide cost-shared funding to demonstrate the commercial-scale integration of coal gasification and F-T synthesis technologies to produce electricity, steam, and liquid fuels. At the site of the proposed project, it is reasonably foreseeable that no new activity would occur. Thus, under the no-action alternative, no construction or operation of the proposed facilities would occur; no site preparation would be required, such as clearing of trees and other vegetation; no employment would be provided for construction workers in the area or for operators of the proposed facilities; and no resources would be required and no discharges or wastes would occur. This scenario would not contribute toward the removal of anthracite culm, which is stacked locally in numerous piles that were set aside during previous mining of anthracite coal.

Because no new activity would occur, current environmental conditions at the site, which are described in Section 3 (Existing Environment), would not change. Specifically, air quality in the area would remain the same, and no changes would occur to existing geologic and soil conditions in the area. No changes would occur to the quantity and quality of surface water and groundwater and the availability of water supplies in the area. Ecological resources would remain the same. No changes would affect the current management of solid and hazardous waste in the proposed project area.

Table S.1 presents a comparison of key potential impacts between the proposed facilities and the scenario under the no-action alternative.

Table S.1. Comparison of key potential impacts between the proposed facilities and the no-action alternative

Resource	Impacts of the proposed facilities	Impacts of the no-action alternative
Land use and aesthetics	The locations of the proposed main plant and ancillary facilities would not affect offsite land use. Over the 26-year operating life of the proposed facilities, approximately 1,000 acres of land would be reclaimed after culm removal to provide feedstock for the facilities. Because the visual landscape is already conspicuously marked with industrial structures, the proposed facilities would not alter the industrial appearance of the site and would not degrade the aesthetic character of the area.	Offsite land use would not be affected. No additional structures would be built. Impacts would remain unchanged from existing conditions.
Air quality	Modeling results based on emissions from the proposed facilities predicted that maximum concentrations would be less than their corresponding significant impact levels. Concentrations would be negligible at the nearest Prevention of Significant Deterioration (PSD) Class I area (Brigantine Wilderness Area). The small percentage increases in VOC and NO_x emissions would not be likely to degrade local or regional air quality sufficiently to cause violations in the O_3 standards, but the magnitude of the degradation cannot be quantified. Limits stated in the authorized permit would ensure that the proposed facilities would be a minor new source of hazardous air pollutants. Because nearly complete H_2S removal from the shifted synthesis gas would be required by the downstream F-T synthesis process, odorous emissions of H_2S should not be perceptible. Upon initial operation of the proposed facilities, conditions at Interstate 81 would be monitored and, if warranted, flashing lights would be installed to warn motorists of fog. Increases in CO_2 emissions from the proposed facilities would be large in terms of number of tons per year but small in comparison to global totals.	No additional air emissions would occur. Impacts would remain unchanged from existing conditions.
Geology	Because the proposed main plant would be built over rock units that do not contain coal, the plant would not be affected by subsidence from mining activities. Subsidence could, however, affect product transfer lines and related facilities in the valley of Mahanoy Creek. The possibility of abrupt subsidence has decreased over time following the closure of underground mines, and will continue to decrease in the future. The potential risks of product line leakage due to gradual subsidence would be reduced by inspecting product lines regularly and repairing any problems.	Impacts would remain unchanged from existing conditions.

Table S.1. Continued

Resource	Impacts of the proposed facilities	Impacts of the no-action alternative
Water resources	Impacts attributable to construction-related runoff would be minimal. Because the facilities would increase the area of impervious surface on Broad Mountain, water that previously would infiltrate the soil to enter the groundwater under Broad Mountain would instead be included in the wastewater discharge to Mahanoy Creek valley, thus reducing groundwater recharge to the aquifers on Broad Mountain. Estimated recharge within a 1,000-ft radius of the Morea well should remain sufficient to meet the needs of the Morea water system, and other wells farther away from the proposed facilities should not be affected. Operation of the proposed facilities would reduce the water volume in the Gilberton mine pool and the volume of water needed to be pumped from the mine pool and discharged to Mahanoy Creek in order to prevent flooding. These changes would result in reduced stream flow in the creek. However, the creek would not go dry from receiving less mine pool water because the creek's minimum flows would be maintained by continuous discharges from mine openings in upstream portions of the watershed. Discharge of treated effluent to the mine pool by seepage from the tailings pond would be expected to improve mine pool water quality by reducing concentrations of acidity and dissolved metals. Consequently, water pumped from the mine pool to Mahanoy Creek would also improve in quality.	No changes in water requirements or discharge of effluents would occur. Impacts would remain unchanged from existing conditions.
Floodplains and wetlands	The main plant and a new culm beneficiation plant or expansion of the existing facility would be located above the elevation of the 100-year floodplain. Ancillary facilities that would cross the 100-year floodplain of Mahanoy Creek would be placed atop an existing trestle at an elevation above the 100-year floodplain. No new construction within the floodplain would be required. Construction and operation of the proposed facilities would have no adverse effects on wetlands because none are present on the project site.	No floodplains or wetlands would be affected. Impacts would remain unchanged from existing conditions.
Ecological resources	Loss of approximately 76.5 acres of deciduous forest to construct the main plant and ancillary structures would affect wildlife species. Over the long term, the terrestrial habitat created on reclaimed lands from which culm would be obtained would offset the loss of deciduous forest. Impacts to aquatic habitats and fish from construction and operation of the proposed facilities would be minor to negligible because no surface waters are on or in the immediate vicinity of the proposed project site. Because the proposed facilities would not be located within an area that provides habitat for any protected species except for occasional transient individuals, it is unlikely that any such species would be affected by project construction or operations.	No clearing of trees or other vegetation would be required. Impacts would remain unchanged from existing conditions.

Table S.1. Continued

Resource	Impacts of the proposed facilities	Impacts of the no-action alternative
Socioeconomic resources	Construction and operation of the proposed facilities would not result in major impacts to population, housing, local government revenues, or public services in Schuylkill County. With regard to environmental justice, one nearby census tract has significant minority populations residing at the Mahanoy and Frackville State Correctional Institutions. Disproportionately high and adverse impacts to these populations would not be expected because (1) air quality impacts would not be appreciable with the exception of temporary fugitive dust during construction; and (2) the adjacent Mahanoy State Correctional Institution is a sealed facility in which inmates and employees would not be exposed to outside air except during periods of outdoor activity. Similarly, for two nearby census tracts that have relatively high poverty rates, disproportionately high and adverse impacts to these populations would not be expected. Increases in traffic during project construction would likely cause congestion and have an appreciable impact on traffic flow and safety during morning and afternoon commutes. WMPI personnel have committed to contacting the Pennsylvania Department of Transportation to discuss potential mitigation options, including signaling, road widening, and scheduling work hours and/or deliveries to avoid periods of heavy traffic. Although the impacts of additional operations-related traffic would be less severe than those during construction, they would be more long lasting. WMPI personnel have committed to contacting the Pennsylvania Department of Transportation to discuss the same potential mitigation options. Impacts on historic or archaeological properties would not be likely because the State Historic Preservation Office has identified no such properties in the project area.	No employment would be provided for construction workers in the area or for operators of the proposed facilities. Impacts would remain unchanged from existing conditions.
Waste management	Solid wastes and byproducts generated during operations would be sold, used for mine reclamation, or transported to an offsite commercial landfill for disposal. None of these materials would be expected to be hazardous as defined under the Resource Conservation and Recovery Act (RCRA). The Toxicity Characteristic Leaching Procedure test would be performed to verify this expectation, and any wastes found to be subject to RCRA hazardous waste regulations would be handled in accordance with applicable procedures. Wastewater from the gasification and liquefaction processes would be combined with stormwater from process areas in an equalization basin, then routed to a series of oil-water separation units where droplets of oil and grease would be recovered and oily sludge would be collected for disposal or recycling to the gasification process. Effluent from this stage of treatment would be mixed with non-oily wastewater streams and routed to a biological treatment unit that would combine aeration with clarification in order to treat wastewater with high levels of chemical and biological oxygen demand. This unit would be designed to consume the organic compounds and nutrients in the wastewater, yielding treated effluent for discharge and a biological sludge for disposal. Potential odor impacts from liquid waste streams would be controlled by treating all process wastewater within enclosed facilities prior to discharge to the final equalization basin.	No changes would result to the current management of solid and hazardous waste in the proposed project area. Impacts would remain unchanged from existing conditions.

Table S.1. Concluded

Resource	Impacts of the proposed facilities	Impacts of the no-action alternative
Human health and safety	Regarding operational air emissions, all maximum ambient concentrations of criteria pollutants from the proposed facilities were estimated to be less than their corresponding significant impact levels, and the air permit establishes maximum allowable limits to ensure that the proposed facilities would be a minor new source of hazardous air pollutants (e.g., mercury). The proposed facilities would be subject to Occupational Safety and Health Administration standards. During construction, permits would be required and safety inspections would be employed to maximize worker safety. Construction equipment would be required to meet all applicable safety design and inspection requirements, and personal protective equipment would be used, as needed to meet regulatory standards. Operations would be managed from a control room. All instruments and controls would be designed to ensure safe start-up, operation, and shut down. No perceptible changes in electromagnetic fields would occur because no new transmission line would be built. The probability of a catastrophic accident associated with the facilities, including transportation of liquid fuels off the site, would be very unlikely.	Impacts would remain unchanged from existing conditions.
Noise	During operations, the increase in noise levels (i.e., 3 dB) would probably be imperceptible at the Mahanoy State Correctional Institution because of (1) the distance between the prison and the proposed project site, (2) planned noise attenuation measures, (3) natural and man-made terrain features and structures, and (4) the limited period during which inmates are allowed outside the sealed prison. No perceptible change in noise associated with the proposed facilities would be expected at the nearest residence or other offsite locations.	No additional noise would be generated. Impacts would remain unchanged from existing conditions.